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Some native weeds and their probable origin

ROLAND M. HARPER

Every botanist who attempts to classify the vegetation of a populous region, such as the northeastern United States, is confronted at the outset with the problem of distinguishing the natural or undisturbed habitats from those which have been modified by civilization. Of course all our vegetation has felt the influence of civilization more or less, but it seems possible to draw a fairly sharp line between those habitats whose flora is essentially the same now as it was in prehistoric times and those where it has been so much altered that it is impossible to reconstruct the primeval conditions.

In general it seems to be true — and the task of the phytogeographer would be almost hopeless if it were otherwise — that external influences of slight amount or of short duration produce no permanent changes in vegetation. As an example of the first kind, when the pine trees are removed from an area of southern pine-barrens the amount of sunlight reaching the ground is increased probably not more than 10 per cent., and this seems to make no perceptible difference to the herbaceous vegetation.* But if the ground is then plowed up and cultivated, the original vegetation disappears, most of it never to return.†

In the second place, if a deciduous forest is destroyed by lumbermen or swept by fire it presents a very different appearance for a time, but if left undisturbed it will regain its former appearance and flora, or very nearly so, as soon as the trees have time to grow up again. But if the cutting or burning is repeated every few years the ground will gradually become covered with herbs and short-lived shrubs, among which it is difficult for trees to regain a foothold.

(This tendency of vegetation to restore itself seems to be quite analogous to elasticity in physics. For example, if any solid substance of suitable material and form, such as a copper wire, is bent slightly and released immediately it will quickly resume its original shape; but if bent too much or kept bent too long it will remain so.)

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*See Ann. N. Y. Acad. Sci. 17 : 117. 1906.

† See Mohr, Contr. U. S. Nat. Herb. 6 : 120. 1901.

In New England and southern New York, to which the following discussion will be chiefly confined, the modification of plant environments through human agency has come about chiefly in the following six ways.

A. Trees of a forest destroyed by fire, lumbering, etc., and allowed to grow up again without delay. Forest fires of course occurred more or less before man existed, but their frequency has been so greatly increased by civilization that they may now without serious error be regarded as one of its effects.

B. Trees removed and then kept down by repeated mowing, burning, grazing, or trampling, as in hay-fields, railroad rights-of-way, pastures, lawns, roads, and paths.

C. Original vegetation all or nearly all destroyed and soil disturbed, as in cultivated and abandoned fields, embankments, and excavations. Similar conditions are sometimes, though rarely, brought about in a natural way by landslides, etc.

D. Foreign matter added to the soil, as in gardens, barnyards, waste places, railroad yards, and ballast grounds.

E. The amount of water changed, as in drained marshes and swamps, irrigated lands, ditches, and artificial ponds.

F. Entirely new substrata provided, such as roofs, walls, wharves, pavements, and refuse and artificial substances of all kinds.

The plants which follow treatment *A* are practically all native in the adjacent undisturbed forests or elsewhere in the vicinity, and those of *E* are also usually native, within a few miles at least. After *B* and *C*, European weeds are numerous, if not in the majority. The plants of *D* are nearly all exotics, and those of *F* are mostly cellular cryptogams of very wide distribution.*

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* For the names of some of them see Meyen, Grundriss der Pflanzengeographie, 87–92. 1836 (or pages 73–78 of the English translation, 1846). The alleged new species of fungi which have been described in the last few years from such places as "a box where acetic acid had been spilled," and "among grasses where coal ashes had been lying," as well as the numerous native fungous parasites of exotic plants, are also to be classed here.

The plants of the various unnatural habitats created in the manners above indicated may also be classified as follows:

1. Species undoubtedly indigenous in our forests, which spring up quickly in clearings and to a lesser extent in other unnatural places, and tend to restore them to their original condition.

2. "Fireweeds," or species especially characteristic of recently burned woodlands, gradually disappearing with the process of reforestation. Some of them are herbs, some shrubs and some trees. If reforestation is prevented, as in case *B*, some of the fireweeds are apt to remain and behave like ordinary roadside or introduced weeds. There are probably hardly more than a score of typical fireweeds in the northeastern states, but very little is known as yet of their origin and history. Lists of such plants for various northeastern localities have been published as follows:

Dawson, Am. Jour. Sci. II. **4**: 164–166. 1847. (Nova Scotia.)

Thoreau, Maine Woods, appendix. (There are several editions, so it is hardly worth while to give date and page.)

Prentiss, Bull. Torrey Club **10**: 44. 1883. (Adirondacks.)

Chickering, Bot. Gaz. **9**: 193–194. 1884. (Maine.)

Sargent, Tenth Census U. S. **9**: 492, 497, 502–503, 510, 558. 1884.

Fernald, Trans. Mass. Hort. Soc. **1905**: 11. 1905.

Chittenden, U. S. Bureau Forestry Bull. **55**: 21, 37–38, 50–51, 67–70. 1905. (New Hampshire.)

3. Species native in naturally treeless or sparsely wooded dry areas in the same general regions, and therefore well adapted to such unnatural habitats as those under the second head. The naturally treeless areas of this part of the country, other than those of the seacoast and high mountains, are very imperfectly understood. The principal ones seem to be the "sand-plains" of the less elevated parts of New England, and the "Hempstead Plains" of Long Island, which resemble in aspect some of the western prairies. Existing botanical literature gives very little information about such places. Two lists of New England sand-plain plants were published in 1903; one by J. W. Blankinship (Rhodora **5**: 128, 129) for eastern Massachusetts, and one by W. E. Britton (Bull. Torrey Club **30**: 581–585) for southern Connecticut. Dr.

Blankinship's list is rather fragmentary, Dr. Britton's includes a number of introduced species, and neither is as sharply limited as it might have been. The flora of the Hempstead Plains, which is somewhat similar, has never been published, but it seems to comprise about 80 native species of vascular plants.

4. Species undoubtedly native in open woods, pine-barrens or prairies farther south and west, which have probably come into the northeastern states only since the clearing away of most of the forests has destroyed much of the humus and made the summers warmer. To this class probably belong a number of species of Compositae, Leguminosae, *Crataegus*, etc., but it would be difficult to specify any particular species.

5. Species which grew in Indian clearings before the white man came, so that it is now impossible to determine where they are really native. There is not much on record about these in the parts of our country which have been settled the longest. *Phytolacca decandra* is supposed to be one of them, and a few others of southern distribution are mentioned in Mohr's Plant Life of Alabama, page 54. Such plants are mostly to be looked for in the first three classes of unnatural habitats, and they cannot be very numerous.

6. Species not included in any of the five foregoing classes, supposed to be native in the eastern United States, but apparently confined to unnatural habitats, and behaving like introduced plants, from which they are to be distinguished in most cases only by documentary evidence. These will be discussed at length farther on.

7. Weeds naturalized from foreign countries, where most if not all of them have been accustomed to unnatural habitats for centuries. These occupy habitats of class *D* almost to the exclusion of natives, are very common in *C*, less so in *B*, rare in *A*, and are wanting in perfectly natural habitats. The number of weeds certainly known to have been introduced into this country is quite large, constituting at present in the northeastern states about 20 per cent. of the angiospermous flora.*

8. Exotic plants which grow spontaneously for a time, but are

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* For an interesting discussion of some plants of this and the next class see Fernald's lecture on "Some recently introduced weeds" (Trans. Mass. Hort. Soc. **1905**: 11–22. 1905).

not sufficiently adapted to our conditions to spread. These, often designated adventive or fugitive plants,* are confined chiefly to habitats *C* and *D*, especially the latter.

9. Cultivated plants, which are unable to compete with those in the other groups, and grow only where they are planted and protected by man, as in fields, gardens, hothouses, flower-pots, etc. In the northeastern states probably nine tenths of the species of this and the two preceding groups are of European origin.

It is with class 6, the native weeds, that we are chiefly concerned. A few lists of such plants for various parts of the eastern United States and neighboring territory have been published as follows:

NEW BRUNSWICK: Ganong, Bot. Gaz. **36**: 432, 435. 1903; **42**: 89–90, 98–99. 1906.

MAINE: Thoreau, Maine Woods (appendix).

VERMONT: Brainerd, Jones, & Eggleston, Fl. Vt. 94. 1900.

MASSACHUSETTS: Blankinship, Rhodora **5**: 128, 135. 1903.

PENNSYLVANIA: Harshberger, Bull. Torrey Club **31**: 152–155, 156–158. 1904.

MICHIGAN: Beal, 5th Rep. Mich. Acad. Sci. (Mich. Flora) 27. 1904; F. B. H. Brown, Bot. Gaz. **40**: 277. 1905; Transeau, Bot. Gaz. **40**: 435, 438, 440–441, 443–444, 446–447. 1905.

ILLINOIS: Brendel, Flora Peoriana 36. 1887.

VIRGINIA: Kearney, Contr. U. S. Nat. Herb. **5**: 407–409, 472. 1901.

TENNESSEE: Gattinger, Fl. Tenn. (ed. 2) 13–14. 1901.

GEORGIA: Harper, Bull. Torrey Club **27**: 327–328, 329, 421. 1900; **30**: 338. 1903; Ann. N. Y. Acad. Sci. **17**: 114–116. 1906.

ALABAMA: Mohr, Contr. U. S. Nat. Herb. **6**: 64 (near top), 65 (middle). 1901.

MISSISSIPPI and LOUISIANA: Lloyd & Tracy, Bull. Torrey Club **28**: 83. 1901.

It happens, however, that in all or nearly all of the lists just cited there is more or less admixture of exotics or of undisputed natives, or both. To illustrate therefore just what kind of plants I would call native weeds I offer the following examples, which I have observed in southern New England (mostly in Southbridge, Mass., and neighboring towns) and the western half of Long Island. Those to which interrogation points are prefixed may possibly belong to some of the eight other classes mentioned above, but they are mentioned to attract attention and invite discussion, by which their status may perhaps be settled.

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* See in this connection Mohr, Contr. U. S. Nat. Herb. **6**: 53–56. 1901.

- ? *Krigia virginica* (L.) Willd.
- *Lactuca canadensis* L. (and perhaps others).
- *Achillea Millefolium* L.
- *Bidens frondosa* L. (and perhaps others).
- *Gnaphalium obtusifolium* L.
- *Anaphalis margaritacea* (L.) B. & H.
- *Erigeron ramosus* (Walt.) B. S. P.
- *Leptilon canadense* (L.) Britton.
- *Aster Novae-Angliae* L.*
- " *vimineus* Lam.
- " *diffusus* Ait. (and several others).
- *Euthamia graminifolia* (L.) Nutt.
- " *caroliniana* (L.) Greene (and intermediate forms).
- *Solidago canadensis* L.
- " *nemoralis* Ait. (and some others).
- *Xanthium* spp.
- *Ambrosia trifida* L.
- " *artemisiaefolia* L.
- *Lobelia inflata* L.
- *Specularia perfoliata* (L.) A. DC.
- *Sambucus canadensis* L.†
- *Houstonia coerulea* L.
- ? *Plantago major* L.
- " *Rugelii* Decne.
- *Linaria canadensis* (L.) Dumont.
- *Ilysanthes gratioloides* (L.) Benth.
- *Mentha canadensis* L.
- ? *Koellia virginiana* (L.) Britton.
- *Prunella vulgaris* L.
- *Verbena urticaefolia* L.
- *Convolvulus Sepium* L.
- *Asclepias syriaca* L.
- ? *Cornus candidissima* Marsh.
- ? *Ptilimnium capillaceum* (Michx.) Raf.
- *Kneiffia pumila* (L.) Spach.
- *Oenothera biennis* L. (and others).
- *Isnardia palustris* L.
- *Viola* (many species, especially the acaulescent blue-flowered ones).
- *Hypericum maculatum* Walt.
- " *mutilum* L.
- *Sarothra gentianoides* L.
- ? *Celastrus scandens* L.
- ? *Rhus typhina* L.
- *Euphorbia maculata* L.
- " *Preslii* Guss.
- *Acalypha virginica* L.
- " *gracilens* Gray.
- ? *Polygala verticillata* L.
- *Oxalis* (the yellow-flowered ones).
- ? *Lespedeza* (several species).
- *Cassia marylandica* L.
- *Chamaecrista* spp.
- *Crataegus* (many species).
- *Agrimonia* spp.
- *Potentilla simplex* Michx. (and others).
- ? *Fragaria virginiana* Duchesne.
- ? " *americana* (Porter) Britton.
- *Rubus* spp. (numerous blackberries).
- *Lepidium virginicum* L.
- *Cardamine hirsuta* L.
- *Ranunculus abortivus* L.
- ? *Anemone cylindrica* Gray.
- *Silene antirrhina* L.
- ? *Polygonum aviculare* L.
- " *erectum* L.
- " *pennsylvanicum* L.
- ? " *Hydropiper* L.
- ? " *sagittatum* L.
- " *scandens* L.
- ? *Rumex Acetosella* L.
- *Urtica gracilis* Ait.
- ? *Salix discolor* Muhl. (and others).

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* See Torreya 7: 173. 1907.

† See Gray, Am. Nat. 1: 493–44. 1867; 2: 38–39. 1868; Allison, Auk 21: 473. 1904; Harper, Ann. N. Y. Acad. Sci. 17: 154. 1906.

Sisyrinchium (several species).
? *Smilax rotundifolia* L.
? *Juncus effusus* L.
" *marginatus* Rostk.
? " *bufonius* L.
" *tenuis* Willd. (and probably others).
? *Spirodela polyrrhiza* (L.) Schleid.
? *Carex lurida* Wahl.
? " *pallescens* L.
" *festucacea* Willd.
? " *Muhlenbergii* Schk. (and probably a few others).
? *Fimbristylis autumnalis* (L.) R. & S.
Eleocharis obtusa (Willd.) Schult. (and perhaps others).
? *Cyperus filiculmis* Vahl.
Eragrostis pectinacea (Michx.) Steud.
Eragrostis Purshii Schrad.
Agrostis hiemalis (Walt.) B. S. P.
? *Sporobolus vaginaeflorus* (Torr.) Vasey.
? *Aristida gracilis* Ell.
" *dichotoma* Michx.
Muhlenbergia mexicana (L.) Trin. (and perhaps others).
Chaetochloa spp.
Panicum (several species).
? *Syntherisma sanguinale* (L.) Nash.
" *filiforme* (L.) Nash.
Paspalum setaceum Michx. (and perhaps others).
? *Andropogon* spp.
? *Juniperus communis canadensis* Loud.*
? *Equisetum arvense* L.
? *Botrychium obliquum* Muhl. (and some allied forms).

In the southeastern states there are many other species in the same category, and a complete list would probably include something like 10 per cent. of the species of flowering plants supposed to be indigenous in the eastern United States. How to treat these plants in phytogeographical works is therefore an important question.

If they are indigenous, but now confined to unnatural habitats, the first inquiry that suggests itself is: where did they grow a few hundred years ago, when their present habitats did not exist? Unfortunately, New England and New York were pretty well settled before botany became a science, and by the time American botanists began to study vegetation, rather than plants merely, there were nearly as many roads, pastures, clearings, etc., as there are today, so early botanical literature throws little light on the subject. Several explanations have been suggested, and each may account for some species, but none will satisfactorily cover all cases.

In the first place, it seems to be a common belief among those northeastern botanists who have given any thought to the matter that in prehistoric times all our native weeds occupied natural openings in the forests, which have now been completely obliterated, and that the multiplication of clearings has given these plants opportunity to become widely disseminated. The chief objection to this theory is that the only naturally treeless areas in New England and New York (as far as can be ascertained from botanical literature) seem to be bodies of water, marshes, meadows, sand-plains, dunes, high cliffs, and mountain summits; * and few if any of the plants in question belong to such habitats. But even granting that there could have been natural openings of a kind which no longer exist in their original form, if all our native weeds inhabited them their flora must have been far richer in proportion to area than that of any other habitat known in the eastern United States today, which is incredible.

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* See U. S. Forestry Bull. 55: *pl. 5. f. 1.* 1905. This is a shrubby form of *Juniperus communis*, which has gone by several different names in recent years.

It would seem therefore that the only possible explanation for most of these species is that they have originated in some manner or other in the last few centuries, as I ventured to suggest in the case of some Georgia weeds not long ago.† Some of the species in question may even have originated within the last fifty years or so, for it is scarcely conceivable that all the new species of *Aster*, *Viola*, *Crataegus*, *Rubus*, etc., which have been described from unnatural habitats in recent years could have been overlooked by the botanists of a century ago, if the plants existed then. Our herbaria do not help us much in this particular, for specimens more than fifty years old are very rare, and almost never cited in the descriptions of new species.

There is more than one way of accounting for the modern origin of some of these species. Dr. Brainerd ‡ has sagely suggested that the great multiplication of species of *Viola*, *Crataegus*, *Panicum*, etc., is chiefly due to increased opportunities for hybridization; which seems to be a modification of Kerner's § theory that all species now living originated by hybridization. But although the occurrence of natural hybrids has been demonstrated in some of the genera listed and strongly suspected in others,[*] hybridization would hardly increase the number of species ten-fold in *Crataegus* for instance in so short a time. And some of the genera are still so small that the possible hybrids in them must be very limited in number.

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* According to Thoreau the only openings in the Maine woods, about the middle of the 19th century, were rivers and lakes, burns and clearings, mountain summits, and perhaps a few meadows. The few plants of this class mentioned by him grew in burns and clearings. There are some evidences of about two square miles of dry land naturally treeless among the Adirondacks in Hamilton Co., N. Y., 1,855 feet above sea-level (see Field & Stream **12**: 490. Oct. 1907, and the West Canada Lakes topographic sheet of the U. S. Geological Survey), but there seems to be nothing on record about its flora.

† Ann. N. Y. Acad. Sci. **17**: 116. 1906.

‡ Rhodora **8**: 10. 1906.

§ Pflanzenleben **2**: 582–588. 1891. (English translation, "Natural History of Plants" **2**: 595–600.)

For the large number of cases still unexplained we shall probably have to fall back on the mutation theory, as being the only other one which explains the sudden origin of new forms. Only a few well-authenticated cases of mutation have hitherto been detected, and there is still considerable diversity of opinion as to the cause of the phenomenon. De Vries seemed to think that each species passes through periods of mutation at long intervals, and that his epoch-making discovery was largely due to the fact that he happened to have a mutating species of *Oenothera* under careful observation just at the critical period. MacDougal has succeeded in inducing mutation, or something that looks very much like it, in the same genus by artificial means, and from this he infers that the cause of mutation may at least in some cases be external to the plant.[†] Blaringhem seeks this external cause in mechanical injuries (such as cutting the stem) at the time of maximum vegetative activity.[‡] This seems quite plausible in view of the fact that de Vries's Oenotheras are said to have grown in a field which was cut over sometimes, and most of our meadow and roadside plants get similar treatment every year.

Although the writer does not claim to be familiar with the physiological aspects of the mutation theory or theories, it seems to him perfectly reasonable to suppose that change of environment alone may be a sufficient cause, or stimulus, of mutation, or at least of rapid evolution. Indeed it is more than likely that all evolutionary changes (other than hybridization) in the vegetable kingdom have been preceded by changes of environment. Geological history confirms this view, for one of its most prominent features is the great difference in the organisms of successive periods, the intervals between which were marked by great and rapid changes on the earth's surface.* Another circumstance which points to the same conclusion is that closely related species do not usually occupy the same habitat, as every experienced field worker knows.†

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[*] See MacDougal, Bot. Gaz. 43: 57. 1907.

[†] See Yearbook, Carnegie Inst. 5: 129. 1907.

[‡] Mutation et Traumatismes. Paris, 1907.

An extremely significant point is that no case of mutation seems to have hitherto been detected in any species whose environment has not been disturbed by civilization. All plants now being studied which give promise of mutation phenomena are either weeds or cultivated plants. Probably no species can come into close contact with civilization for any length of time without being more or less modified sooner or later. As Dr. H. J. Webber said about ten years ago:‡ "No instance is known of a plant being long under cultivation and not furnishing several varieties."

Most of our introduced weeds, or rather their ancestors, doubtless experienced the same change of environment in the Old World centuries ago that our native weeds have in more recent times; and the first step in the economic development of every one of our cultivated plants which is no longer known in the wild state must have been the creation of a new environment for it, purposely or otherwise.

Against the comparatively sudden origination of new forms under the pressure of changed environment might be urged the often cited experiments of European botanists who have transplanted alpine plants to lowlands and vice versa without producing any permanent or inheritable variations thereby. The answer to this is that probably such experiments have not been continued long enough. For all we know, a century or more of exposure to different conditions may be necessary in most cases to start mutation, or "break the type," as Dr. Webber puts it. Some species are doubtless more susceptible than others,§ and those experimented with might have happened to be among the least susceptible.

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* See the papers by Dall, King, LeConte, and White, cited below.

† See in this connection Abrams, Science II. **22**: 836–838. 22 D 1905.

‡ Yearbook U. S. Dept. Agr. **1896**: 103. 1897.

§ This might be inferred from the fact that in the foregoing list such large families as Gentianaceae, Ericaceae, Umbelliferae, Orchidaceae, and Liliaceae are not represented at all, and some others very sparingly in proportion to their numbers. Woody plants must change more slowly than herbs, and this is perhaps one reason why the species of *Crataegus* and *Rubus* have not been greatly multiplied by systematists until lately.

Another important point to be considered is that if our native weeds have sprung into existence in modern times, they should all be closely related to species that are undoubtedly native. This indeed seems to be true in most cases; and the rest deserve further investigation. It seems very likely that in this class of plants we may have many examples of polygenesis, i. e., of a single species originating independently at several or many different places; a phenomenon whose possibility was denied by Darwin and some of his successors.*

The suggestion that mutation may be induced by civilization is not exactly a new one, for premonitions of it have appeared in one form or another in the writings of botanists and zoölogists several times in the last few years,† and one occasionally hears interesting rumors about it from persons who have not ventured to put their ideas on the subject into print; but it does not seem to have attracted much attention yet, especially among systematists, many of whom are going right on describing "new species" from unnatural habitats without inquiring into their history or making any distinction between them and species which are truly indigenous to our primeval forests.‡

To admit the modern origin of native weeds would simplify a number of vexed problems, and put an end to many of the fruitless discussions of the indigeneity of certain species which have been going on in some of our botanical journals.§ It would also partly explain the greater richness of the herbaceous flora of Great

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* See Clements, Bot. Surv. Neb. 7: 68–77. 1904; Research methods in ecology 230–232. 1905.

† See Dunn, Jour. Bot. 40: 359. 1902; Spalding, Plant World **10**: 140. Je 1907; Cockerell, Science II. **26**: 72–73. 19 Jl 1907.

‡ As recently as August, 1907, a prominent systematist has published the following statement (Jour. Bot. 45: 290): "The origin of these many forms [of *Cra'aegus* in North America] I cannot pretend to account for. The theory that they are hybrids of recent origin, however, can hardly be accepted."

§ In one magazine alone, the Journal of Botany, I have noticed discussions of this kind (mostly relating to British plants) at the following places in the last twelve volumes: 34: 201–204. 1896; 37: 356–358. 1899; 40: 356. 1902; 41: 141–142, 150–154, 285, 289–290. 1903; 43: 89–94. 1905; 44: 138–142, 207–213, 390. 1906.

Britain, New England, etc., as compared with more newly and thinly settled regions of equal area and diversity. For in these old countries few if any native species have yet been completely exterminated, while the flora has been greatly augmented by the species which seem to have been produced to meet the new conditions of environment, to say nothing of introduced species, which must have originated in a similar manner somewhere else.

Furthermore, it will be noticed that the list given contains the names of the genera which in the past decade or two have furnished the most employment for species-makers in this part of the world; such as *Achillea, Bidens, Aster, Viola, Euphorbia, Oxalis, Lespedeza, Chamaecrista, Rubus, Agrimonia, Polygonum, Salix, Sisyrinchium, Smilax, Juncus,* and *Panicum.* By analogy we may expect some of the other genera to prove equally polymorphous before long. European botanists have long been having similar troubles with *Hieracium, Crepis, Centaurea, Cirsium, Campanula, Galium, Orobanche, Euphrasia, Euphorbia, Astragalus, Trifolium, Rubus,* * *Rosa, Potentilla, Saxifraga, Ranunculus, Fumaria, Erysimum, Silene, Dianthus, Crocus, Carex,*† *Festuca, Poa, Avena,* and numerous other genera, and doubtless for similar reasons.

Such plants as these, however interesting they may be to the horticulturist, economic botanist, evolutionist, and laboratory worker, have no place in a description of the natural or primeval vegetation of the country, and their study can throw but little light on the pre-historic development of the native flora, which is one of the chief concerns of the phytogeographer. Their number will probably continue to increase as long as the population of the earth increases, and when they are described it would seem desirable to keep them by themselves, like cultivated plants, instead of cumbering the pages of our manuals with them, to the confusion and despair of the average botanist. In the present state of our knowledge it may seem impossible to make a sharp distinction between native weeds and members of the original flora; but authors of new species hereafter might at least do a great service to their successors by describing the habitats as explicitly and systematically as possible in every case. Habitat has been almost universally regarded by systematists as a matter of minor importance, or ignored entirely; but inasmuch as it represents the combined expression or resultant of geological history and all the properties and adaptations of the species, its importance cannot be overestimated.*

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*The perplexities of this genus in Europe are so great that English botanists have invented a special name, "batologists," for those who study it most.

† *Carex,* although one of our largest genera, has not furnished as many "new species" in the Eastern United States in the last fifty years as several formerly much smaller genera have. May this not be correlated with the fact that very few of our *Carices* are found in unnatural habitats?

The following works (most of which have not been mentioned in the foregoing pages), together with the references given in some of them, bear more or less directly on the subject under discussion.†

Blaringhem, Louis. Mutation et traumatismes. 1–248. *pl. 1–8.* Paris, 1907. (From Bull. Sci. de la France et de la Belgique, vol. 41.) Reviewed by W. C. W[orsdell] in Jour. Bot. **46**: 201–203. Je 1908.

Dall, W. H. On a provisional hypothesis of saltatory evolution. Am. Nat. **11**: 135–137. Mr 1877.

Dawson, J. W. On the destruction and partial reproduction of forests in British North America. Am. Jour. Sci. II. **4**: 161–170. S 1847. (Deals especially with succession of vegetation in burned areas.)

Dunn, S. T. Origin of the deadnettles in Britain. Jour. Bot. **40**: 356–360. O 1902. Discussed by E. S. Marshall in the next number (390–391).

Dunn, S. T. A preliminary list of the alien flora of Britain. 1–30. 1903. (Not seen.) Reviewed in Jour. Bot. **41**: 141–142. Ap 1903; and discussed by H. J. Riddelsdell in same, **43**: 89–94. Mr 1905.

Dunn, S. T. Alien flora of Britain. i–xiv + 1–208. 1906. (Not seen.) Reviewed by H. J. Riddelsdell in Jour. Bot. **44**: 138–142. Ap 1906; and discussed by E. S. Marshall in same, 207–213. Je 1906.

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*In this connection pages 10–11 of Dr. B. L. Robinson's address on "The problems of ecology" (read before the "Congress of Arts and Science" in St. Louis in 1904, and reprinted in 1906 from the fifth volume of the proceedings of the Congress) are well worth reading.

† Some of these I have seen only in the library of the Staten Island Association of Arts and Sciences. For the privilege of examining most of the remainder I am indebted to the New York Botanical Garden.

Gilbert, E. G. A note on hybrids. Jour. Bot. **41**: 348–359. O 1903. (Refers to *Rubus* mostly.) Discussed by E. S. Marshall in the next number (379).

Gray, Asa. The pertinacity and predominance of weeds. Am. Jour. Sci. III. **18**: 161–167. 1879. (Reprinted in his Scientific Papers **2**: 234–242. 1889.)

Halsted, B. D. American and English weeds compared. Plant World **3**: 171–173. N 1900.

King, Clarence. Catastrophism and evolution. Am. Nat. **11**: 449–470. Au 1877.

LeConte, Joseph. On critical periods in the history of the earth, and their relation to evolution; on the Quaternary as such a period. Am. Jour. Sci. III. **14**: 99–114. Au 1877; Am. Nat. **11**: 540–557. S 1877.

MacDougal, D. T. Heredity and environic forces. Science II. **27**: 121–128. 24 Ja 1908. (Vice-presidential address, Section G, A. A. A. S.)

Malinvaud, Ernest. The species and hybrids of *Mentha*. (Translated from the French.) Jour. Bot. **38**: 171–174. Ap 1900. (See also Plant World **10**: 139. Je 1907.)

Rothrock, J. T. A nascent variety of *Brunella vulgaris* L. Contr. Bot. Lab. Univ. Pa. **1**: 64–65. 1892. (See also Amer. Bot. **13**: 21. S 1907.)

Thoreau, H. D. The Maine woods. (Originally published in 1864. My copy is an 18mo, with 359 pages and an introduction, published by T. Y. Crowell & Co. of New York in 1906. The list of plants occupies pages 329–348.)

Webber, H. J. Influence of environment in the origination of plant varieties. Yearbook U. S. Dept. Agr. **1896**: 89–106. *f. 16–23.* 1897. (A very interesting and valuable paper, which does not seem to have received the recognition it deserves, though the author is well known.)

White, C. A. The relation of phylogenesis to historical geology. Science II. **22**: 105–113. 28 Jl 1905.